

Research on City Image Logo Design Methods and Communication Strategies Based on Peirce Semiotics

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Abstract: Based on Peirce's semiotic theory, this study systematically explores the methodological path of urban image logo design. Through an in-depth analysis of the basic theories of Peirce's semiotics, Peirce's symbolic trichotomy, ternary communication model and ternary composition theory are synthesized and applied to the design methodology of urban image signs. This interdisciplinary methodology aims to enhance the effectiveness of urban image logo design and its communication power among the public. The study constructs an innovative framework for city image logo design from the three key dimensions of semiotics: internal logic, meaning transformation and communication cycle. The framework not only explains the application mechanism of Peirce's semiotic theory in urban image logo design, but also proposes a set of scientific and rigorous design methods and communication strategies, which not only has important theoretical value, but also has a guiding significance for the practical activities of urban image logo design.

Keywords: City Image Logo; Peirce's semiology; Design methodology; Propagate

1 Introduction

A city image logo is a comprehensive visual symbol system that conveys the unique character and spiritual connotation of a city through specific design elements and creative expressions. City image logo includes visual language symbols such as graphics, colors, words, etc., and at the same time, it integrates multi-dimensional contents such as historical and cultural background of the city, urban planning, and future vision of the city. The core component of a city image logo is usually the iconic graphic design, which can convey the city's characteristics and concepts in a clear and concise way, and at the same time, together with the appropriate color and text, it can enhance the recognition and memory points.

A successful city logo should have a distinctive personality, stand out from the crowd, and be easily understood and accepted by the public. However, due to the differences in cultural backgrounds, values, and aesthetic preferences of different audience groups, designing a city image logo that can transcend these differences and has broad appeal and recognition remains a challenge in the design field. Therefore, from the perspective of logo design, this paper explores the application of Peirce's semiotic system in the design of urban image logos, and proposes a new way of thinking under the perspective of semiotics for the design of urban

image logos.

2 City Image Signs and Peirce's Semiotics

2.1 City image logo

As a multi-dimensional symbol system, the city image logo, through the organic combination of visual design elements such as graphics, text and color, deeply explores and presents the deeper connotations of the city culture, and integrates the city's history, current situation and future outlook to form a figurative visual symbol. Under the background of globalization, the design of city image logo pays more and more attention to the combination of international vision and local culture, and strives to create a unique city public image with global appeal and local characteristics. City image logo is of great significance to the city, which is not only an important medium for spreading the city image, but also the key to enhance the city's popularity and attractiveness. With the increasingly fierce competition among cities, the role of city image logo in city marketing and brand building is becoming more and more prominent. In the wave of globalization, city image logo is not only a symbol of city identity, but also a bridge for cultural exchange. Therefore, the design and communication strategy of city image logo needs to keep pace with the times and adapt to the multicultural communication environment. In-depth study of the city's history, culture, social characteristics and other factors to ensure that the logo can accurately convey the uniqueness and connotation of the city. At the same time, international expressions in different cultural backgrounds and interpretive contexts should also be taken into account to ensure that the logo can be properly understood and accepted in different contexts.

2.2 Peirce's semiology

Semiotics is the science of the role of symbols in human cognition, thought, and information transfer[1]. Charles Sanders Peirce and Ferdinand de Saussure are considered the founders of the two major branches of semiotics. Peirce's communication thought is the core constituent department of his semiotics[2]. Prof. Zhao Xingshi points out that Peirce's semiotics aims to explore the laws and mechanisms of symbol communication[3]. Peirce's "symbolic triadic relation" theory holds that "a symbol is a thing which is related to its object on the one hand and to the interpretant on the other, and in this way introduces the interpretant into a relationship with the object which is in turn opposite to the relationship between the symbol itself and the object" [4]. That is, the symbol is a dynamic circular triad consisting of representation, object and interpretant, which contrasts with Saussure's "symbolic binary relation" model. In Peirce's theory, the meaning of a symbol is dynamically evolving rather than static and unchanging. This suggests that each receiver may interpret the same symbol differently depending on his or her experience and cultural background. This reading generates new symbols in the mind of the interpreter, which in turn generates new items of interpretation, forming a chain of infinitely derived meanings, as shown in **Figure 1**:

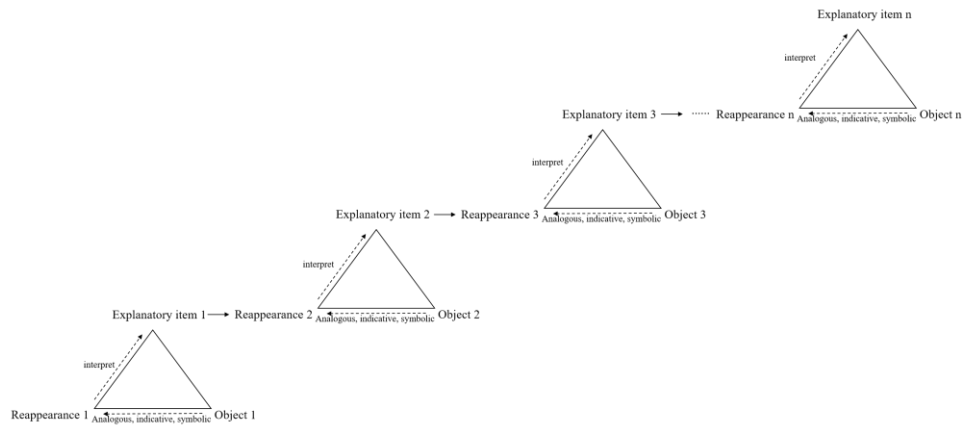


Fig. 1. Diagram of the infinite diffeomorphism process of a symbol

Therefore, the dissemination and communication of symbols is a complex meaning construction process involving multiple levels. As a symbol, the city sign not only conveys visual information, but also resonates with the public's cognition and emotion through the multi-level interpretation of interpretive items, thus effectively shaping and disseminating the unique image of the city. The dynamic, open and circular characteristics presented by Peirce's semiotics help to solve the problem of city image sign design and communication.

3 Semiotic Construction of City Image Logo Design Methods and Communication Strategies

3.1 The process of communicating the meaning of symbols

Within the framework of Peirce's semiotic theory, the goal of semiotic research is to explore how symbols express and convey meaning. In his book *Principles and Deductions of Semiotics*, Professor Zhao Yiheng emphasizes that the interconnection between symbols and meanings constitutes the core of semiotics[5]. The expression of symbols aims at conveying meaning to stimulate the process of interpretation; while the interpretation of symbols gradually approaches the original expression of symbols in the process of pursuing meaning. Taking the city image logo as an example, the textual meaning carried by the logo triggers the interpretation in the interaction with the audience, and the audience continuously explores the intention that the designer expects to convey in the process of interpretation, thus constructing an interpretive meaning, as shown in **Figure 2**. The communication of a city image logo is essentially an inter-temporal dialog between the designer (the sender of meaning) and the audience.

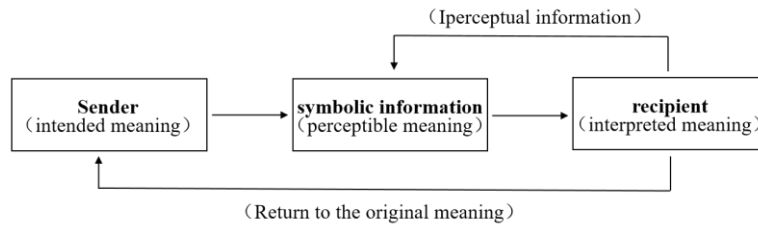


Fig. 2. Flowchart of Communication of Symbolic Meaning

In Peirce's semiotic system, the transmission of symbolic meaning is not only a way of communication across time and space, but also a complex cognitive activity. In Peirce's semiotics, symbols are understood as part of a triadic relationship, i.e., symbol, object and interpretive term. The "interpretive term" here refers to the meaning or idea produced by the symbol in the mind of the interpreter. Peirce's ternary model of communication consists of three sets of interpretive terms: intentional, psychologically valid, and shared interpretive terms[6]. Among them, the intentional interpretation term refers to the significance of the symbol that the sender presupposes and expects the interpreter to be able to understand directly, i.e., the sender's initial and direct understanding of the symbol, which is the symbol's initial and direct significance, and doesn't involve any further explanations or inferences; the effectual interpretation term is the effect that the symbol has actually caused in the interpreter's mind, which is the symbol's actual role and influence in a specific situation, and may change with the interpreter's different interpretation; and the common interpretation term refers to the final and stable meaning of the symbol, which is the end point of consensus or understanding reached after a series of interpretation activities. In the process of communication, the intentional interpretation term and the effectual interpretation term dialog with each other and finally merge to form the common interpretation term, as shown in **Figure 3**:

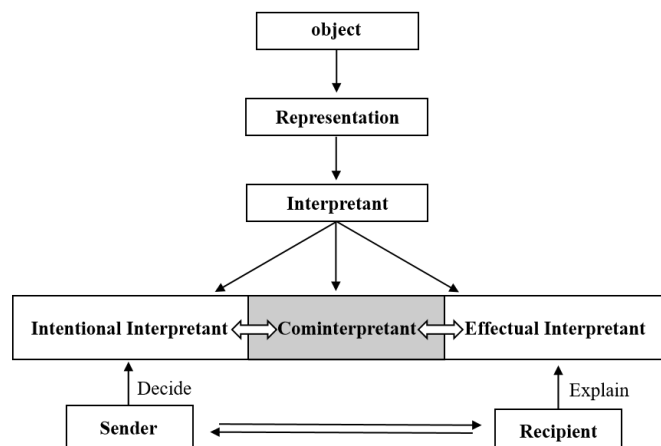


Fig. 3. Explanatory term trinomial

In Peirce's symbolic ternary model of communication, the ternary model of communication requires that both parties involved in the communication have "common ground", a concept that refers to a set of understandings and systems of meanings that must be shared between the participants in the communication process. This common ground not only serves as a prerequisite for communication, but also ensures that the sender and receiver of the message can assign similar or identical meanings to the symbols so that communication can be realized. Therefore, in the communication process of an urban image symbol, it is required that the symbol be able to establish effective communication between the sender and the receiver, and the focus of effective communication is whether the urban image symbol can be correctly interpreted in a specific cultural and social context. The meaning of a symbol is not fixed, but generated in a specific interpreter (i.e. receiver), which requires the designer to fully consider the cultural background and interpretation habits of the target audience when creating the symbol. In this way, a city image symbol can effectively convey the core values and meanings it aims to express.

3.2 Symbolic Encoding and Audience Decoding of City Image Signs

The process of coding the symbols of a city's image is a complex communication activity that involves transforming abstract concepts such as the city's culture, history and values into concrete visual symbols[7]. This process not only requires creative visualization of the city's qualities, but also takes into account the multiple interpretations of the symbol in different cultural and social contexts. The decoding process of the audience, on the other hand, is a subjective, interpretive activity based on personal knowledge, experience and cultural background. The receiver understands and interprets the symbols through his or her own cultural framework, a process that may vary according to individual differences[8]. Thus, the effectiveness of symbolic communication depends on the receiver's individual ability to interpret the symbols and his or her background knowledge.

The complete process of symbol communication is essentially a cycle from symbol encoding to symbol decoding. In this cycle, the sender is responsible for encoding urban culture and development concepts into communicable symbols, while the audience decodes the information according to these symbols to complete the transmission of symbols. As shown in **Figure 4**, In the framework of communication science, encoding and decoding constitute the core components of the information transfer process, representing the two key stages of message construction and interpretation respectively[9].

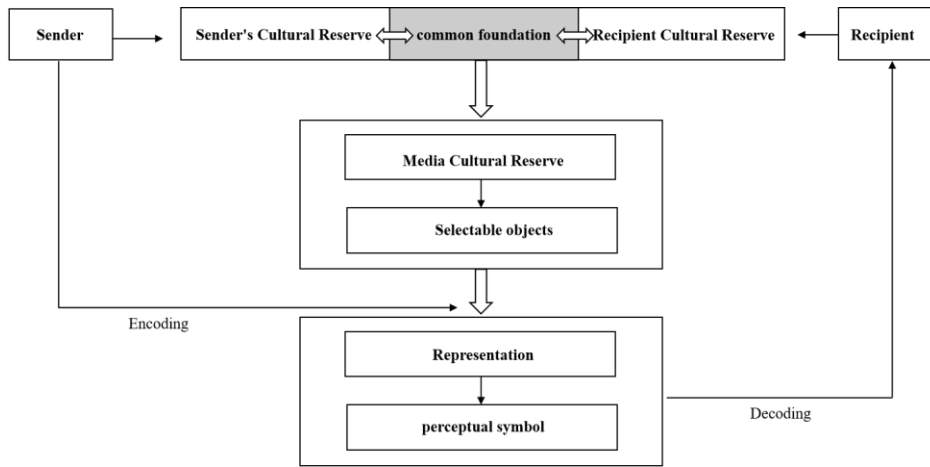


Fig. 4. Symbol encoding and audience decoding flowchart

In the process of encoding symbols, the sender should focus on building a cultural infrastructure that is shared with the receiver, rather than being based solely on his or her own cultural reserves. In the communication process, the sender needs to select and encode messages based on a wide range of cultural knowledge so that they can be widely understood across cultural differences. Similarly, receivers will interpret the symbols based on their own cultural reserves in the decoding process. Therefore, when constructing urban identity symbols, it is crucial to look for the intersection of the sender's and receiver's cultural reserves, which helps to establish a common interpretive base and ensures that the symbols encoded by the sender can be interpreted by the receiver in a correct and reasonable manner.

3.3 Semiotic Composition of Urban Cultural Symbols

In the process of city image logo design, the challenge for designers is how to capture and transform the diverse cultural symbols of the city. The designer has to systematically collect these symbolic elements and deeply analyze their connotations in order to abstract them and transform them into visually recognizable images. In this transformation process, the urban cultural symbol system can be subdivided into three different layers: the external layer, the internal layer and the interactive layer[10]. These levels correspond to the material manifestation of the urban cultural symbols, the spiritual core, and the cognitive response triggered in the audience's mind. Drawing on Peirce's semiotic trichotomy, i.e., symbols, indicative symbols and prescriptive symbols, a more refined model of the hierarchical structure of urban cultural symbols can be constructed as shown in Table 1:

Table 1. Relationship between the hierarchical structure of city image signs and the symbol trichotomy interpretation model

Hierarchical structure	Symbol Properties	Elemental	Mode of action	Extraction path
External layer	Similar symbol	Patterns, colors, text, etc.	Direct perception	Similarity correlation
Internal layer	Indicator symbol	Culture, traditions,	Indirect	Neighbor

		development philosophy, etc.	perception	ood or causality correlation
Interactive layer	Statute symbol	Cultural background, values and emotions, etc.	Conceptual response	common correlation

The deconstruction of urban cultural symbols can be divided into the extrinsic layer, the intrinsic layer and the interactive layer. The extrinsic layer is the intuitive perception level of the symbols, covering elements such as patterns, colors, and words. These elements, as likeness symbols, enable the audience to directly perceive the characteristics of the city due to their direct similarity with the represented objects. The intrinsic level contains those indirect perceptual elements that are linked to the city's culture, tradition and development concepts, usually expressed as indicator symbols, which require the audience to have a certain background knowledge and understanding of the city. The interactive layer, on the other hand, is the level of conceptual responses and involves the statute symbols, which are deeply rooted in the cultural context, values and emotions that define the interpretation and understanding of the city's cultural symbols. This layer emphasizes the interaction and communication between the cultural symbols and the audience, and is a dynamic interpretive process in which the audience's personal experiences and emotional responses play a key role.

4 The Semiotic Expression Model of City Image Logo Design

Using the theoretical framework of Pierce's semiotics, especially the theories of ternary communication, trichotomy and ternary composition, a semiotic expression model of urban logo design is constructed as shown in **Figure 5**. The model is based on the three dimensions of internal logic, meaning transformation and communication cycle, and is analyzed in depth at three levels: the design level, the cultural level and the semiotic level.

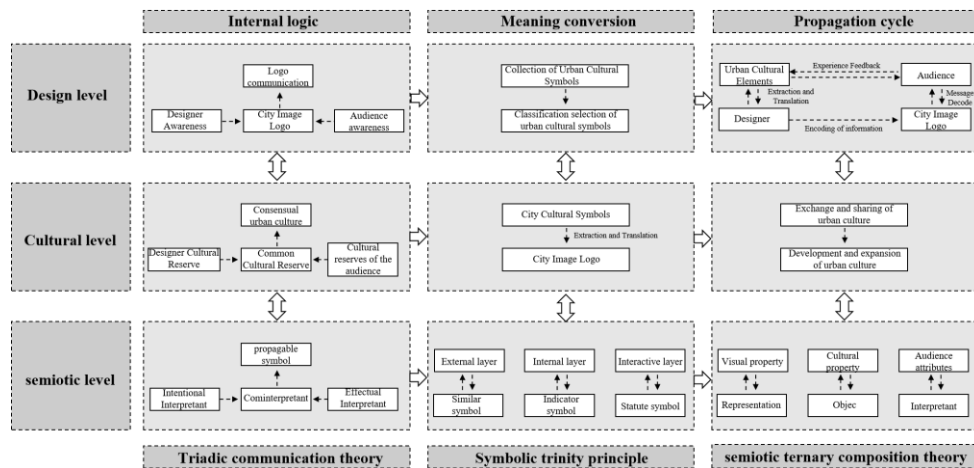


Fig. 5. Semiotic Expression Model of Urban Logo Design

At the design level, the model explores the workflow of designers in the process of city image logo design. Designers need to create on the basis of the common cognition between

themselves and the audience, and carefully collect and screen the symbolic elements of the city culture to ensure that the selected elements have strong representativeness and communication power. Attention is paid to the user's experience and feedback on these symbolic elements, and they are coded and processed to design a recognizable city image logo. At the cultural level, the model focuses on the process of transforming cultural meanings, transforming abstract urban culture into concrete visual elements through artistic techniques, so as to shape a unique city image logo. At the semiotic level, the model reveals the deep logic of city image logo design, combines the design layer and cultural layer with the semiotic theory, and puts forward a set of systematic methodology of city image logo design.

4.1 Determining the internal logic

The process of city image logo design is essentially a process of communication between designers and audience groups. This process is a kind of deep-level communication based on the basic knowledge and cultural background shared by both sides. The design logic of the city image logo is formed on the consensus established between the designer and the audience group, which is not only the understanding and recognition of the city culture, but also the basic condition of the symbol communicability. The designer interacts with the audience group through the city symbol, thus promoting the dissemination and integration of the city culture. In this process, the principle of consensus is the basis for realizing the emotional resonance and cultural identity of the audience. At the same time, the easy-to-communicate media symbol ensures that the city image logo can be correctly understood and interpreted by the audience, so that the designer's inner interpretation of the city image can be accurately conveyed to the audience.

4.2 Symbol meaning conversion

The rationality of the existence of symbols as vehicles for the transmission of meaning is based on the existence of meaning itself. The essence of symbols lies in explaining meaning to the objective world and inducing interpretation[11]. In the process of encoding and decoding symbolic meaning, whether the audience can correctly interpret the symbolic meaning becomes the key link of communication. Association is an important psychological mechanism for audiences to understand the meaning of symbols, and it ensures accurate interpretation of symbols through mental association[12]. Take the red signal light as an example, it usually triggers the association of "prohibit" or "stop", prompting people to take corresponding actions, such as stepping on the brakes or stopping forward.

The principle of constructing symbolic meaning lies in the conversion of abstract concepts (e.g., "stop moving") into concrete visual images (e.g., "red signal light") by means of associations. This transformation of symbolic meaning is not only visual, but also leads the audience to associate it with broader concepts such as urban culture and values, thus facilitating the transmission and exchange of urban culture.

4.3 The information dissemination cycle

The core task of designers in city image logo design is to encode the city's cultural elements into a perceivable city image logo. This process involves not only visual design, but also a process of information encoding. After perceiving these visual symbols, the audience participates in the process through decoding and feedback mechanisms, and their feedback

may prompt the designers to make further adjustments and innovations to the symbols. Therefore, the communication of symbols from designers to audience groups constitutes a dynamic loop system, which contains four stages: encoding, transmission, decoding and feedback, and its purpose is to ensure the effective transmission of information and the sharing of symbolic meaning.

In this communication cycle, the communication between designers and audiences transcends the limitations of time and space, and through the continuous adjustment and innovation of symbols, it not only deepens the consensus between the two sides, but also promotes the reintegration and innovation of urban culture. When constructing city image symbols, attention should be paid to the organic combination of visual attributes, urban cultural attributes, and audience-user attributes, so that the cyclic dissemination of symbols can be transformed into a continuous dialogue process, thus maximizing the transmission of information and the sharing of symbolic meanings.

5 Conclusions

Starting from the design process of city image logo, this study combines the knowledge of Charles Sanders Peirce's semiotic theory to propose a semiotic expression model of city image logo design. The model constructs a continuous design process and communication method by establishing three dimensions: intrinsic logic, semiotic meaning transformation, and communication cycle. Intrinsic logic requires that in the design of city image logos, emphasis is placed on the basis of consensus between designers and audience groups, which is the basis for successful communication of city image logos. The symbolic meaning transformation link ensures the relevance of the city image logo to the cultural elements of the city, and ensures that it can trigger associations in the minds of the audience groups and promote interpretation, which is a necessary condition for the dissemination of the city image logo. The communication cycle reveals the continuous interaction and meaning reproduction of the city image logo in the audience group, forming a dynamic symbolic communication system that continuously strengthens the sense of identity and belonging to the city image.

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